Risk Perception, Academic Performance, and Knowledge of the COVID-19 Pandemic among Nursing Students

Samia Eaid Elgazzar

Assistant Professor, Department of Medical-Surgical Nursing, College of Nursing, Qassim University, Saudi Arabia

Assistant Professor, Department of Medical-Surgical Nursing, Faculty of Nursing, Port-Said University, Egypt

E-mail: s.elgazzar@qu.edu.sa   https://orcid.org/ 0000-0002-9820-7813

Abstract

Background: Global education systems are faced with a challenge from COVID-19. **Aim:** This study aimed to examine risk perception, academic performance, and knowledge of the covid-19 pandemic among nursing students. **Methods:** From March 5 to April 20, 2020, a cross-sectional descriptive study design was conducted in the nursing college of Qassim University. The study was conducted with a purposive sample using a self-administered online survey made available on specific social platforms. The total enrollment in this study was 190 nursing students. **Results:** The results showed that most students had good knowledge of COVID, 53.7% of them had high perceptions of their academic achievement, and 51.6% of them had moderate perceptions of the risk of COVID. Furthermore, the highly knowledgeable student nurses had a mediocre academic record (r =0.377, p=0.001). Additionally, pupils who performed better academically also displayed lower risk perception (r= -0.216, p=0.003). **Conclusions:** Our research indicated that Saudi Arabia's future frontline healthcare workers, nursing students, demonstrated a high degree of understanding, risk perception, and academic achievement toward COVID-19. When employing suitable preventative measures to stop the spread of the disease, it is also crucial to update the student's knowledge of the diagnosis and case treatment of COVID-19. **Recommendations** that conducting in-service training courses on COVID-19 is essential for enhancing academic performance.

Keywords: Risk Perception, Academic Performance, and Knowledge, COVID-19, Nursing Students

Introduction

New respiratory viruses called coronavirus infections have been related to both the common cold and severe acute respiratory syndrome **(Huang et al., 2020; Organization & others, 2020)**. The 2019 novel coronavirus infection (COVID-19) was declared a public health emergency of global concern by the World Health Organization (WHO) in January **(Ghodsi et al., 2021)** due to its high pathogenicity and mortality rates; the COVID-19 outbreak stood out from prior coronavirus outbreaks **(Alfieri et al. 2020)**. All levels of the school system have been influenced by the COVID-19 pandemic. Many institutions around the world postponed or canceled all on-campus events to prevent crowds and, consequently, the spread of infections. However, these behaviors have more detrimental effects on the economy, health, and society **(Agha & Agha, 2020)**.

The likelihood of illness spreading has been decreased by the implementation of numerous governmental measures. These strategies comprise restrictions on travel, the need for travelers to remain in quarantines, social exclusion, the prohibition of public gatherings, the closing of schools, colleges, and companies, the requirement that people work from home, curfews, and lockdowns **(Bedford et al., 2020; Gostin & Wiley, 2020)**. Authorities have implemented curfews or lockdowns in several countries throughout the

world as a preventative measure against the rapid spread of viral infections (Paital et al., 2020). The economic, educational, health and tourism sectors are all negatively impacted by these policies **(Pragholapati, 2020).**

Undergraduate students will now be taught online due to the suspension of traditional classroom instruction in several schools and universities (Sahu, 2020). This type of education provides a different approach to reducing contact between teachers and students or between students themselves **(Pragholapati, 2020)**. Due to economic and technological barriers, many students, however, are unable to participate in online education.

Social, cultural, experiential, and cognitive factors, as well as knowledge, attitudes, and beliefs, all affect how people perceive a threat. In a study on the avian flu outbreak, risk perception and self-efficacy were found to be inversely correlated, which means that the lower one's risk perception was, the higher their degree of self-efficacy **(De Zwart et al., 2007).** Self-efficacy and risk perception **(Cori et al., 2020; De Zwart et al., 2009)** have an impact on people's willingness to take measures during outbreaks. Furthermore, recent research has shown that self-efficacy is essential for promoting health-related intentions and actions. According to reports, compared to students in other health professions, nursing students experience more anxiety as a result of their studies (Savitsky et al., 2020). This is likely to be made worse by additional pressures related to social and academic changes brought on by COVID-19 in the community (Lewnard & Lo, 2020) and its effects on the delivery of nursing education. Clinical work, academic performance, and life quality are all negatively impacted by anxiety **(Sanad, 2019).**

Significance of the study

Regardless of generation, the COVID-19 epidemic has had an impact on people's lives in several ways, including education, economics, and equality **(Chakraborty& Maity, 2020).** Students have specifically experienced a significant change in their learning environment.

Additionally, during the coronavirus outbreak, students' perceptions of the risk of COVID-19 may have an impact on their academic performance. Studies that focus on this result (academic performance) during the COVID-19 epidemic are important because it is difficult to deliver an education whose quality is unaffected by the existing environment, even in the case of distant learning. It is obvious that for educational institutions to be able to take action to lessen their students' challenges, dealing with this issue necessitates knowing and recognizing the components that influence said outcome **(Santomil et al., 2016)**.

Aim of the study:

To examine risk perception, academic performance, and knowledge of the COVID-19 pandemic among nursing students.

Research Questions:

Q1. What is the nursing students' level of risk perception toward COVID-19?

Q2. What is the nursing students' level of academic performance during COVID-19?

Q 3. What is the nursing students' level of knowledge regarding COVID-19?

Q4. What is the relation between sociodemographic and risk perception, academic performance, and knowledge?

Methods:

Design: Descriptive cross-sectional research design

Sampling:

Sample type: purposive sampling

Sample size: According to the Steven equation, the estimated sample size was 190 student nurses, with a 95% confidence level and a 0.05 precision rate **(Steven.,2012).**

$$n = \frac{N \times p(1-p)}{[[N-1 \times (d^2 \div z^2)] + p(1-p)]}$$

P= 0.5

N= Total population

Z= Z value "1.96" D= Standard Error

n= sample size.

Tools of data collection:

Online surveys were available from March 5 through April 20, 2020. Through social media, university emails, and phone numbers, students were given access to an online survey link. This link is https://forms.gle/HQ5x4DbyMW39Rym1. It consisted of four parts: demographic variables, knowledge, risk perception, and academic success. **Part 1** age and educational attainment were among the demographic factors. **Part 2** to evaluate knowledge of COVID-19 (Y\ild\ir\im & Güler, 2022). The "guidelines for clinical and community management of COVID-19" released by the Chinese national health commission served as the basis for the questionnaire's development. The questionnaire had twelve questions, including four clinical indicators, three transmission routes, and five questions about COVID-19 prevention and control. These queries had responses ranging from "I don't know" to true or false. A correct response received one point, whereas an incorrect or ambiguous response received zero. A higher score showed greater familiarity with COVID-19, and the overall knowledge score varied from 0 to 12. The internal consistency of the knowledge questionnaire in our sample was satisfactory, with a Cronbach's alpha coefficient of 0.71 (Sheeran et al., 2015). A modified version of the **(Savitsky et al., 2020)** academic performance measurement scale is included in **Part 3**. Ten items on this scale, with responses on a 4-point Likert scale ranging from 1 (never) to 4, were included (always). With a reliability of 0.92, the minimum and maximum scores were 10 and 40, respectively. Scores of up to 24 indicate low academic performance, 25 to 29 indicate moderate, and 30 or more indicate excellent academic performance.

Part 4. The risk perception questionnaire **(Lewnard & Lo, 2020),** which consists of nine items, was graded on a 5-point ordinal scale from 1 to 5 (1 equal strongly disagree, 2 equal somewhat disagree, 3 equal neutral, 4 equal somewhat agree, and 5 equal strongly agree).

Higher scores indicate a higher perceived COVID-19 risk. The scores of the individual components were summed to determine the total scores. The entire level of risk assessment is indicated by the total score, which is presented in standardized sten units. low-risk, moderate-risk, and high-risk perceptions are indicated by scores of less than 10, between 10 and less than 20, and between 20 and 30 points, respectively.

Operational design

The preparatory phase**,** Reliability of tools, the validity of tools, pilot research, and field activities were all included in the operational design.

The phase of preparation to establish techniques for data collecting entailed researching pertinent literature for various study-related topics using books, journals, the internet, and periodicals.

Validity of tools

Utilizing face and content validity, the suggested instruments are tested for validity. To check whether the tools measure what they are supposed to, face validity involves looking at the objects. The purpose of the content validity study is to analyze whether the tools' content addressed the study's objectives. Five experts assessed the tools once they were built by the investigator. The tool was examined by professionals in the faculty of nursing at Port said university for sentence clarity, relevance, accuracy, thoroughness, simplicity, and applicability; some sentences were rephrased with small changes made. The ultimate forms were then created.

Reliability of tools

The Cronbach alpha test was used to assess the reliability of the produced tools. Student nurses' knowledge reliability test scores were 0.71, academic performance reliability test scores were 0.85, and risk perception reliability test scores were 0.976.

Pilot study

The level of clarity, viability, application, and the average time needed to be completed by each respondent were tested in a pilot study with 10% of participants. The appropriate changes were made. These responses were not included in the total research participants. The link was distributed through online social media platforms such as Twitter, Telegram, and WhatsApp groups.

Ethical consideration

The Qassim university nursing research ethical committee approved the study before it was carried out. Additionally, individuals' consent was sought. Participants received guarantees that the information they provided would be kept private and that their names wouldn't appear in research summaries or other publications.

Limitations of the study

As a result of the COVID-19 circumstances and its lockdown measures, which obliged the researchers to utilize a nonprobability sampling technique, the study's findings cannot be generalized.

Statistical analysis

The computer-fed data were assessed using the IBM SPSS software, version 20.0. IBM Corp., Armonk, New York Numbers, and percentages were used to describe quantitative data. The Kolmogorov-Smirnov test was applied to verify the normality of the distribution. To describe quantitative data, the range, mean, standard deviation, and median were utilized. The significance of the results was assessed at the 5% level.

Results:

Sixty-four percent of participants (64.7%) were between the ages of 20 and 26. Of the 190 nursing students at Qassim University in Saudi Arabia, 88.4% of the participants in the current study were nursing students from urban settings (Respectively, 96.8% and 79.5%). **(Table 1).**

Table 1. Socio-demographic characteristics (n =190)

Regarding data relating to Coronavirus found that the majority of them have never encountered or have no corona. The majority (71.6%) are unaware of any deaths caused by the Coronavirus, while 67.4% are aware of family members, friends, or acquaintances who are suffering from the illness **table 2**

The majority of the 190 respondents had good knowledge of COVID, as evidenced by the average knowledge score of 9.83 - SD 1.92, range (0-12), which translates to an overall accuracy rate of 81. 89%. Additionally, this knowledge test had a 94.0% overall score for preventative knowledge with COVID-19. 76.18% of respondents reported on transmission routes. On the other hand, **Table 3** reveals that 69.30% of the new information regarding COVID-19 prevention.

Fig. 1 reveals that, out of 101 students, 52.2% reported having a high perception of their academic achievement, 27.9% reported having a low sense of risk perception, and 18.9% reported having an intermediate perception. The level of academic performance has a mean of 29.96. 51.6% of the kids perceived COVID as having a moderate danger, and 48.4% as having a high risk.

Table 4 shows that there was a moderately positive correlation between academic performance and awareness (r =0.377, p=<0.001), in addition, there was a negative weakly relationship between academic performance and risk perception (r=-0.143, p=0.048). Moreover, there was no or negligible relationship between risk perception and knowledge (r= -0.216, p=0.003).

The age group between 20 and 26 years had a high mean score, as shown in **Table 5**, and there was a significant relationship between age, educational attainment, general knowledge, academic performance, and risk perception. However, statistically, significant differences were discovered between relatives, family, or friends who had previously contracted the Coronavirus and risk perception.

Demographic data	No(%)
Age	
<20 years	67(35.3)
20–26 years.	123(64.7)
Educational level	
Second	68(35.8)
Third	64(33.7)
Fourth	58(30.5)
Residence area	
Rural	22(11.6)
Urban	168(88.4)

Table 2. Data related COVID-19 (n =190)

Data related coronavirus	No(%)
Have you had corona before?	
Yes	39(20.5)
No	151(79.5)
Do you currently have corona?	
Yes	6(3.2)
No	184(96.8)
Has corona affected any of your friends, family, or relatives recently?	
Yes	26(13.7)
No	164(86.3)
Have any of your close friends, relatives, or family members previously encountered the Coronavirus?	
Yes	128(67.4)
No	62(32.6)
Has the Coronavirus claimed any lives?	
Yes	54(28.4)
No	136(71.6)

Table 3. Descriptive analysis of the nursing students regarding scores of knowledge related to COVID-19 (n = 190)

Knowledge related COVID -19	%	Mean (SD)
Clinical Signs		
Mean ± SD.	75.13±26.04	3.01 (1.04)
Transmission Routes		
Mean ± SD.	66.84±30.57	2.01 (0.92)
Preventative measures		
Mean ± SD.	91.89±18.73	4.59 (0.94)
Overall knowledge		
Mean ± SD.	80.04±18.14	9.61 (2.18)

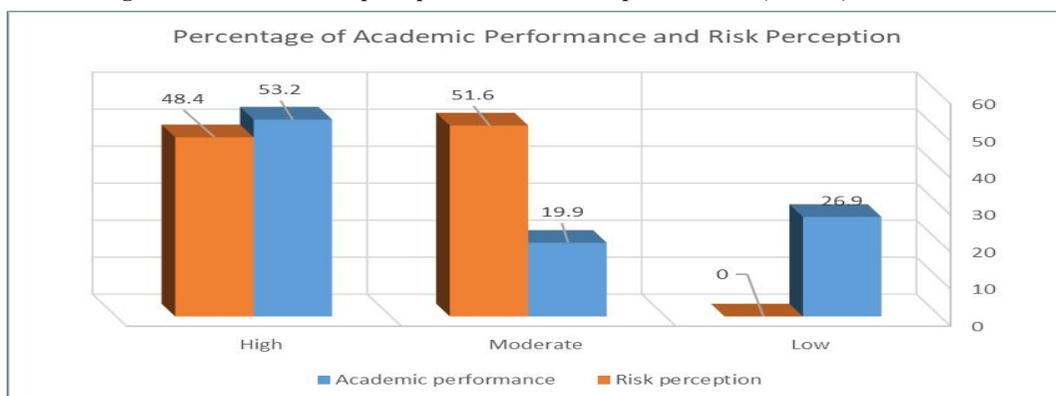**Fig. 1. Total score of risk perception and academic performance (n = 190)**

Table 4. Correlation between knowledge, academic performance, and risk perception (n = 190)

Variable	r	p
Academic performance and risk perception	-0.283*	<0.001*
Knowledge and academic performance	0.221*	0.002*
Knowledge and risk perception	-0.640*	<0.001*

r: Pearson coefficient   *: Statistically significant at p ≤ 0.05

Table 5. Relation between socio-demographic, overall knowledge, risk perception, and academic performance (n=190)

% score	Knowledge		Academic performance		Risk perception	
	Mean ± SD.	Median	Mean ± SD.	Median	Mean ± SD.	Median
Age (years)						
<20 years	73.65±23.29	79.17	60.53±19.38	62.0	66.03±22.12	70.50
20–26 years.	83.61±13.34	83.33	69.16±20.13	69.0	57.07±22.62	54.50
Test of sig. (p)	U= 3203.0* (0.008*)		t= 2.872* (0.005*)		U= 3197.0* (0.009*)	
Educational level						
Second	74.36±22.30	79.17	56.36±19.70	56.50	65.47±21.65	67.0
Third	81.50±12.85	83.33	69.0±17.61	68.50	62.38±22.11	60.50
Fourth	85.79±13.38	83.33	75.84±17.56	78.0	52.57±22.58	41.0
Test of sig. (p)	H=10.592*(0.005*)		F=19.892*(0.001*)		H=11.669*(0.003*)	
Residence area						
Rural	70.83±25.76	75.0	59.22±21.51	55.0	65.83±23.44	77.50
Urban	80.44±16.89	83.33	66.08±19.88	67.0	60.70±22.27	60.0
Test of sig. (p)	U= 1121.50(0.072)		t= 1.379(0.170)		U= 1296.5(0.339)	
Do you currently have corona?						
Yes	75.0±36.64	91.67	76.80±24.40	90.50	60.0±27.82	56.0
No	79.76±16.58	83.33	64.76±19.70	66.0	61.27±22.11	60.0
Test of sig. (p)	U=728.5 (0.365)		t= 1.856(0.065)		U= 828.50(0.778)	
Have any of your close friends, relatives, or family members previously encountered the Coronavirus?						
Yes	72.22±24.80	75.0	62.67±18.87	61.0	68.64±24.06	71.0
No	81.09±15.93	83.33	66.01±20.35	67.50	59.59±21.73	59.50
Test of sig. (p)	U= 1938.0*(0.037*)		t= 0.865(0.388)		U= 1855.5* (0.019*)	

t: Student t-test: F for ANOVA test U: Mann Whitney test   H: H for **Kruskal Wallis test**   *: Statistically significant at p ≤ 0.05

Discussion

The recently identified COVID-19 disease, which was originally identified in Wuhan, China, in December 2019, spreads rapidly both domestically and internationally. Governments all around the world have consequently decided to temporarily close or implement localized closures of educational facilities, which affect more than 60% of students worldwide. The COVID-19 epidemic continues to have a significant impact on daily life, schooling, and study habits. University students, in particular, must contend with the considerable uncertainties of their social and academic lives **(Duygulu et al., 2022)**.

The findings demonstrated that COVID-19 was broadly accepted by Saudi nursing students. Showed that the majority of participants were aware that treating and isolating those who are infected with the Coronavirus is an effective way to stop the virus from spreading, that an infected person should be monitored for 14 days, that the Coronavirus is spread through infected people's respiratory droplets, and that the Coronavirus has three primary symptoms.

Furthermore, as demonstrated by numerous studies **(Garc\'\ia-Fernández et al., 2021; Sanad, 2019; Taber, 2018; Zhong et al., 2020)** mention the COVID-19 knowledge dimension, contend that knowledge is a crucial issue, improved student comprehension, and the promotion of positive attitudes are crucial if educators want their pupils to improve their health behaviors and adhere to preventive measures. Adopting a positive outlook and abiding by limiting measures may considerably improve public health and COVID-19 preparation **(Garc\'\ia-Fernández et al., 2021; Jaspal et al., 2020, 2022; Sanad, 2019; Taber, 2018).** Last but not least, in response to the COVID-19 epidemic, medical professionals from all over the world offered to help hospitals, supplying crucial support for hospital operations and patient care in healthcare systems **(Adesegun et al., 2020; Srichan et al., 2020).**

Online education **(Jarab et al., 2021; Li & Liu, 2020)** enables students to learn at their own pace and supports the growth of self-directed learners. Students said it was more advantageous since an online environment offers a wider selection of instructional materials given in numerous interactive techniques that meet their demands. Additionally, visual learning is more effective than aural learning at aiding pupils in understanding the course material. Because they don't have to commute, students who study at home have more time for their studies **(Li & Liu, 2020).** According to test results, each of these characteristics improved students' academic performance.

According to the findings, there is a moderately positive link between knowledge and academic performance (r =0.377, p=0.001). The findings of this study supported previous research that found a connection between study COVID-19 knowledge and health beliefs, self-efficacy, and behavioral intention in all nursing students. According to the data (**Nnama-Okechukwu et al., 2020),** all nursing students were aware of COVID-19, evaluated their health views, felt more self-sufficient, and took part in an activity to stop the spread of COVID-19.

Furthermore, (**Buckland, 2020; Huang et al. 2020; Pickell et al., 2020)** discovered that those with higher degrees of education also had higher levels of knowledge, self-esteem, and talent belief. According to (**Bdair, 2021),** an individual student's conceptual thinking and knowledge of COVID-19 may be influenced by their degree of academic success, which may also limit their access to online learning. However, mobile learning, a method of instruction through a mobile device, is being used to improve students' comprehension of the COVID-19 curriculum. 81.8% of students, according to reports, believe that mobile learning can increase their knowledge of the subject they are studying. **(K. Mukhtar et al., 2020)** Due to the spreading epidemic, remote learning has gained popularity and is now more flexible than ever for medical students.

The current study found that there was either no link or a very weak correlation between knowledge and risk perception (r= -0.216, p=0.003). Research from the past has shown that COVID-19's perceived threat motivates people to take precautions against hazards, which is expected to have a favorable effect on preventive behaviors and mental health **(Carroll, 2021).** While **(Zhou et al., 2020)** reported that perceived academic performance was significantly adversely connected with anxiety in Spanish university students using the adaptation of the specific perceived self-efficacy scale in conferment situations by COVID-19. Other research **(Zimmerman, 2020)** has shown that attitudes among students and their understanding of preventative measures will rise along with their degree of education.

This study revealed a substantial association between age, education, general knowledge, academic performance, and risk perception, with a high mean score in the 20–26 age group. Contrary to another study **(Biswas et al., 2020)**, this result showed that participants' ages affected their precautions and perception of risk: the older they were, the more measures they took. Additionally, self-efficacy and risk perception were low in older teachers. While another researcher **(Naciri et al., 2020)** found that COVID-19 knowledge did not differ substantially by age, sex, field, or hospital site. This outcome is consistent with the research of **(S. Mukhtar, 2020)**, who found that COVID-19 knowledge levels were comparable regardless of age, gender, academic background, or career. Multidimensional variables could have contributed to this finding.

Other studies **(Alemany-Arrebola et al., 2020)** have revealed that most study participants hold a bachelor's degree or higher, which may explain the high level of knowledge among them, or it may be due to the extensive media coverage, which includes all media outlets, and the pandemic's effects on social life, which compel people to follow. The COVID-19 infection, which is swiftly sweeping the globe, is the biggest global concern. Infections can be managed to a significant extent by healthcare professionals who work closely with infected individuals **(Asmelash et al., 2020)**.

Students at universities are undergoing quick, interrelated changes in their social relationships and cognitive capacities that span childhood and adulthood **(Tang et al., 2021).** Universities have created several strategies to stop the virus's transmission in an expanding and dynamic pandemic. University students have been injured by a variety of novel and unusual things while there has been a coronavirus lockdown. The majority of students around the world are compelled to stay at home, where they are cut off from peers, professors, and university learning resources, to learn remotely using textbooks or online resources. This new academic life included increased demands, stress, and the need to make independent decisions **(Aldhahi et al., 2021)**. It also required various methods for studying and interacting with others. According to the findings of this study, nursing students had a respectable level of knowledge, which is consistent with those of earlier investigations **(Alwani et al., 2020; Olum et al., 2020; Saeed et al., 2021).** One of the study's flaws is that evaluating risk perception can result in bias and distortion. Therefore, risk assessment, academic performance, and understanding of the efficacy of suggested recommended tactics for implementing COVID-19 preventative steps should all be taken into account in future training programs for nurses.

Conclusions

This study highlights some crucial questions about the accuracy of the knowledge and risk assessment for student nurses to develop academic performance during the COVID-19 outbreak. The assistance of risk perception and understanding requires academic performance training programs. The ability to give their patients the finest care while still safeguarding themselves should give nursing students confidence.

Recommendations

Based on the study findings, the study suggests educators should adopt a more holistic approach to student welfare, making sure students are aware of support mechanisms, given the possible interconnected influence of academic, clinical, and personal experiences.

Reference

Adesegun, O. A., Binuyo, T., Adeyemi, O., Ehioghae, O., Rabor, D. F., Amusan, O., Akinboboye, O., Duke, O. F., Olafimihan, A. G., Ajose, O., & others. (2020). The COVID-19 crisis in sub-Saharan Africa: knowledge, attitudes, and practices of the Nigerian public. *The American Journal of Tropical Medicine and Hygiene*, *103*(5), 1997.

Agha, M., & Agha, R. (2020). The Socio-Economic Implications of the Coronavirus and COVID-19 Pandemic: A Review. *URL: Https://Www. Ncbi. Nlm. Nih. Gov/Pmc/Articles/PMC7162753/[Last Checked 2020-10-22]*.

Aldhahi, M., Almutairi, R., Alluhaidan, W., Alshammari, A., Almarzuqi, R., Altaleb, H., ... & Almuaither, T. (2021). Internship preparedness among students in healthcare-related fields in the COVID-19 era: Exploring the attitude and knowledge in Saudi Arabia. Journal of Public Health Research, 10(3), jphr-2021.

Alemany-Arrebola, I., Rojas-Ruiz, G., Granda-Vera, J., & Mingorance-Estrada, Á. C. (2020). Influence of COVID-19 on the perception of academic self-efficacy, state anxiety, and trait anxiety in college students. Frontiers in Psychology, 11, 570017.

Alfieri, N., Manodoro, S., & Marconi, A. M. (2020). COVID-19 does not stop obstetrics: what we need to change to go on safely birthing. The experience of a University Obstetrics and Gynecology Department in Milan. Journal of Perinatal Medicine, 48(9), 997-1000.

Alwani, S. S., Majeed, M. M., Ramzan, Z., Rauf, S., Syed, M. S., Shah, S. H., Hirwani, M. Z., & Hamirani, F. (2020). Evaluation of knowledge, practices, attitude, and anxiety of nurses towards COVID-19 during the current outbreak in Karachi, Pakistan. *Pakistan Journal of Public Health*, *10*(2), 82–90.

Asmelash, D., Fasil, A., Tegegne, Y., Akalu, T. Y., Ferede, H. A., & Aynalem, G. L. (2020). Knowledge, attitudes and practices toward prevention and early detection of COVID-19 and associated factors among religious clerics and traditional healers in Gondar town, northwest Ethiopia: A community-based study. *Risk Management and Healthcare Policy*, *13*, 2239–2250. https://doi.org/10.2147/RMHP.S277846

Bdair, I. A. (2021). Nursing students and faculty members' perspectives about online learning during the COVID-19 pandemic: A qualitative study. Teaching and Learning in Nursing, 16(3), 220-226.

Bedford, J., Enria, D., Giesecke, J., Heymann, D. L., Ihekweazu, C., Kobinger, G., Lane, H. C., Memish, Z., Oh, M., Schuchat, A., & others. (2020). COVID-19: towards controlling a pandemic. *The Lancet*, *395*(10229), 1015–1018.

Biswas, B., Roy, S. K., & Roy, F. (2020). *Students perception of Mobile learning during Covid-19 in Bangladesh: the university student perspective*.

Buckland, R. (2020). Medical student volunteering during COVID-19: lessons for future interprofessional practice. *Journal of Interprofessional Care*, *34*(5), 679–681.

Carroll, S. N. (2021). *FOURTH GRADE STUDENT EXPERIENCES IN MATHEMATICS ASSESSMENT: COMPUTER VERSUS PAPER-PENCIL TESTING MODALITY*. Carson-Newman University.

Chakraborty, I., & Maity, P. (2020). COVID-19 outbreak: Migration, effects on society, global environment and prevention. *Science of the Total Environment*, *728*, 138882.

Cori, L., Bianchi, F., Cadum, E., & Anthonj, C. (2020). Risk perception and COVID-19. In *International journal of environmental research and public health* (Vol. 17, Issue 9, p. 3114). Multidisciplinary Digital Publishing Institute.

De Zwart, O., Veldhuijzen, I. K., Elam, G., Aro, A. R., Abraham, T., Bishop, G. D., Richardus, J. H., & Brug, J. (2007). Avian influenza risk perception, Europe and Asia. *Emerging Infectious Diseases*, *13*(2), 290.

De Zwart, O., Veldhuijzen, I. K., Elam, G., Aro, A. R., Abraham, T., Bishop, G. D., Voeten, H. A.

C. M., Richardus, J. H., & Brug, J. (2009). Perceived threat, risk perception, and efficacy beliefs related to SARS and other (emerging) infectious diseases: results of an international survey. *International Journal of Behavioral Medicine*, *16*(1), 30–40.

Duygulu, S., Kuruca-Ozdemir, E., Erdat, Y., & Kocoglu-Tanyer, D. (2022). University students' risk perception, protective measures, and general health during the COVID-19 pandemic in Turkey. *Disaster Medicine and Public Health Preparedness*, 1–25.

Garc\'\ia-Fernández, J. M., Inglés, C. J., Torregrosa, M. S., Ruiz-Esteban, C., D\'\iaz-Herrero, Á., Pérez-Fernández, E., & Mart\'\inez-Monteagudo, M. C. (2021). *Psychometric properties of the Academic Situations Specific Perceived Self-efficacy Scale in a Spanish students sample of Compulsory Secondary Education*.

Ghodsi, A., Bijari, M., Alamdaran, S. A., Saberi, A., Mahmoudabadi, E., Balali, M. R., & Ghahremani, S. (2021). Chest computed tomography findings of COVID-19 in children younger than 1 year: a systematic review. *World Journal of Pediatrics*, *17*(3), 234–241.

Gostin, L. O., & Wiley, L. F. (2020). Governmental public health powers during the COVID-19 pandemic: stay-at-home orders, business closures, and travel restrictions. *Jama*, *323*(21), 2137–2138.

Hashemi, A. H. G., Yazdanparast, A., & Saeidi31, M. (n.d.). *Knowledge, Attitudes, and Practices toward COVID-19 among University Students Worldwide: A Systematic Review*.

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., Zhang, L., Fan, G., Xu, J., Gu, X., & others. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, *395*(10223), 497–506.

Jarab, A. S., Al-Qerem, W., Mukattash, T. L., & Al-Hajjeh, D. M. (2021). Pharmacy and Pharm. D students' knowledge and information needs about COVID-19. *International Journal of Clinical Practice*, *75*(3), e13696.

Jaspal, R., Fino, E., & Breakwell, G. M. (2020). <? covid19?> The COVID-19 Own Risk Appraisal Scale (CORAS): Development and validation in

two samples from the United Kingdom. *Journal of Health Psychology*, 1359105320967429.

Jaspal, R., Fino, E., & Breakwell, G. M. (2022). The COVID-19 own risk appraisal scale (CORAS): Development and validation in two samples from the United Kingdom. *Journal of Health Psychology*, *27*(4), 790–804.

Lewnard, J. A., & Lo, N. C. (2020). Scientific and ethical basis for social-distancing interventions against COVID-19. *The Lancet Infectious Diseases*, *20*(6), 631–633.

Li, X., & Liu, Q. (2020). Social media use, eHealth literacy, disease knowledge, and preventive behaviors in the COVID-19 pandemic: Cross-sectional study on Chinese netizens. *Journal of Medical Internet Research*, *22*(10), e19684.

Mukhtar, K., Javed, K., Arooj, M., & Sethi, A. (2020). Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era. *Pakistan Journal of Medical Sciences*, *36*(COVID19-S4), S27.

Mukhtar, S. (2020). *Mental health and emotional impact of COVID-19: Applying Health Belief Model for medical staff to general public of Pakistan*.

Naciri, A., Baba, M. A., Achbani, A., & Kharbach, A. (2020). Mobile learning in Higher education: Unavoidable alternative during COVID-19. *Aquademia*, *4*(1), ep20016.

Nnama-Okechukwu, C. U., Chukwu, N. E., & Nkechukwu, C. N. (2020). COVID-19 in Nigeria: Knowledge and compliance with preventive measures. *Social Work in Public Health*, *35*(7), 590–602.

Olum, R., Chekwech, G., Wekha, G., Nassozi, D. R., & Bongomin, F. (2020). Coronavirus disease-2019: knowledge, attitude, and practices of health care workers at Makerere University Teaching Hospitals, Uganda. *Frontiers in Public Health*, *8*, 181.

Organization, W. H., & others. (2020). *Novel Coronavirus (2019-nCoV): situation report, 11*.

Paital, B., Das, K., & Parida, S. K. (2020). Inter nation social lockdown versus medical care against COVID-19, a mild environmental insight with special reference to India. *Science of the*

Total Environment, *728*, 138914.

Pickell, Z., Gu, K., & Williams, A. M. (2020). Virtual volunteers: the importance of restructuring medical volunteering during the COVID-19 pandemic. *Medical Humanities*, *46*(4), 537–540.

Pragholapati, A. (2020). *COVID-19 impact on students*.

Saeed, B. Q., Al-Shahrabi, R., & Bolarinwa, O. A. (2021). Socio-demographic correlate of knowledge and practice toward COVID-19 among people living in Mosul-Iraq: A cross-sectional study. *PloS One*, *16*(3), e0249310.

Sahu, P. (2020). Closure of universities due to coronavirus disease 2019 (COVID-19): impact on education and mental health of students and academic staff. *Cureus*, *12*(4).

Sanad, H. M. (2019). Stress and anxiety among junior nursing students during the initial clinical training: a descriptive study at College of Health Sciences, University of Bahrain. *American Journal of Nursing Research*, *7*(6), 995–999.

Santomil, P. D., Sanfiz, J. M. M., Pazos, D. R., & Agra, S. C. (2016). Determinantes del rendimiento académico del alumnado de una asignatura de contabilidad: el caso de la USC. *REDU: Revista de Docencia Universitaria*, *14*(1), 151–178.

Savitsky, B., Findling, Y., Ereli, A., & Hendel, T. (2020). Anxiety and coping strategies among nursing students during the covid-19 pandemic. *Nurse Education in Practice*, *46*, 102809.

Sheeran, P., Maki, A., Monanaro, E., Bryan, A., Klein, W., Miles, E., & Rothman, A. (2015). The impact of changing attitudes, norms, and self-efficacy on health-related intentions and behavior: A meta-analysis. *European Health Psychologist*, 598.

Srichan, P., Apidechkul, T., Tamornpark, R., Yeemard, F., Khunthason, S., Kitchanapaiboon, S., Wongnuch, P., Wongphaet, A., & Upala, P. (2020). Knowledge, attitudes and preparedness to respond to COVID-19 among the border population of northern Thailand in the early period of the pandemic: a cross-sectional study. *WHO South-East Asia Journal of Public Health*, *9*(2), 118–125.

Steven K. Thompson., (2012): Sampling' 3rded, John Wiley & Sons, p59-60

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, *48*(6), 1273–1296.

Tang, J.-S., Chen, C.-L., Lin, C.-H., & Feng, J.-Y. (2021). Exploring teachers' risk perception, self-efficacy and disease prevention measures during the outbreak of 2019 novel coronavirus disease in Taiwan. *Journal of Infection and Public Health*, *14*(3), 358–364.

Y\ild\ir\im, M., & Güler, A. (2022). COVID-19 severity, self-efficacy, knowledge, preventive behaviors, and mental health in Turkey. *Death Studies*, *46*(4), 979–986.

Zhong, B.-L., Luo, W., Li, H.-M., Zhang, Q.-Q., Liu, X.-G., Li, W.-T., & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International Journal of Biological Sciences*, *16*(10), 1745.

Zhou, D., Du, X., Hau, K.-T., Luo, H., Feng, P., & Liu, J. (2020). Teacher-student relationship and mathematical problem-solving ability: mediating roles of self-efficacy and mathematical anxiety. *Educational Psychology*, *40*(4), 473–489.

Zimmerman, J. (2020). Coronavirus and the great online-learning experiment. *Chronicle of Higher Education*, *10*.